

DA 12432 19 JUNE 64

SECRET

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TO : DIRECTOR 25X1A

FROM : [REDACTED]

ACTION: OSA 1-15

INFO :

25X1A

TOR: 2117Z 19 JUNE 64

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IN 84260

TO PRIORITY

INFO

CITE

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ATTN

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1. [REDACTED] REFERENCE [REDACTED] 1827.

2. (A) CFN PHONE CON 17 JUNE 64, WE PROPOSE JOINT REVIEW OF GYRO STATUS WEEK OF 29 JUNE AT [REDACTED] PARTICIPATION DESIRED. PLEASE ADVISE DATE.

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(B) SUGGEST EXPEDITING [REDACTED] CLEARANCE, IF POSSIBLE, TO PERMIT HIS FULL PARTICIPATION.

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3. SUMMARY OF LAST WEEK'S ACTIVITY.

(A) S/N-2. [REDACTED] ADJUSTED TEMPERATURE CONTROL TO BRING "PITCH" GYRO WITHIN NOISE SPECIFICATION. UNIT RETURNED TO [REDACTED] 16 JUNE AND SHOWED ERRATIC HIGH NOISE, PREDOMINANTLY 50, 100 AND 200 CYCLES PER SECOND, ON LAB FLOOR. TEST REPEATED 17 JUNE ON [REDACTED] LOBBY CONFERENCE ROOM FLOOR AND AGAIN 18 JUNE WITH [REDACTED] PARTICIPATION AND TEST SHOWED NOISE COULD BE BROUGHT WITHIN SPECIFICATION BY ADDITION OF A LOW PASS FILTER TO THE GYRO, OR BY CORRECTION

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GROUP 1
Excluded from automatic
downgrading and
declassification

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OF THE PITCH AXIS ELECTRONICS.

(B) S/N-3. TESTED SIMULTANEOUSLY WITH S/N-2 AT

[] S/N-3 NOISE REMAINED IN SPEC DURING PERIODS OF HIGH BUILDING NOISE, SO REASON FOR 11 JUNE'S OCCASIONAL HIGH NOISE WAS NOT CLARIFIED. UNIT BEING PUT THROUGH REMAINING QUALIFICATION AT [] SCHEDULED 7 JULY DELIVERY MAY BE MISSED DUE TO INTERRUPTION OF TESTS TO EVALUATE S/N-2.

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4. WHILE SUBSTANTIAL PROGRESS HAS BEEN MADE, IT IS CLEAR THAT THE GYRO PACKAGE IS SENSITIVE TO TEMPERATURE AND MOUNTING; AND THE ADEQUACY OF THE GYRO PACKAGE DESIGN FOR THE FULL RANGE OF ENVIRONMENT HAS YET TO BE PROVEN.

5. [] PROJECT PERSONNEL CONDUCTED THOROUGH REVIEW OF ENTIRE SUBJECT 18 JUNE WITH [] (ASST. DIR. OF ENGR.), [] (STAFF CONSULTANT), [] (SR. STAFF ENGR.), [] (SR. STAFF ENGR.), [] (SR. STAFF ENGR.) AND [] (ENGR. BRANCH CHIEF).

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FOLLOWING ARE RESULTS OF REVIEW:

A. SOME [] GYROS APPEAR TO BE FULLY SATISFACTORY, BUT EACH PACKAGE HAS EXHIBITED SOME PROBLEM, WITH ELECTRICAL NOISE NOW BEING MOST PUZZLING.

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B. NOISE THAT IS MOST TROUBLESOME IS IN RANGE 3-5 CPS. SINCE AIR BEARING GYROS SHOW NO SUCH NOISE, WE CONCLUDE THAT THE NOISE IS MOST LIKELY FROM THE BEARINGS. THEREFORE, [] SHOULD BE AUTHORIZED TO CONTRACT FOR ALTERNATIVE GYRO PACKAGES USING AIR BEARING GYROS.

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C. [] SHOULD CAPITALIZE UPON SOME OR ALL OF THREE

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"QUICK FIXES" TO IMPROVE MARGINAL PERFORMANCE :

1. ROTATE THE GYRO AXES ORTHOGONAL TO GRAVITY AND USE A (RESISTOR) RESOLVER NETWORK TO DELIVER SPECIFIED OUTPUTS; OR ROTATE THE "PITCH" GYRO TO THE SAME ORIENTATION THAT THE "YAW" GYRO HAS WITH RESPECT TO GRAVITY.

2. LOWER THE OUTPUT FILTER FREQUENCY FROM 50 TO 30 CPS.

3. USE COOLING FINS OR PAINTS WITH SELECTED EMISSIVITY TO HELP ADJUST TEMPERATURE.

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D. [] SHOULD CHANGE THE WEIGHT SHIFTER LOOP ELECTRONICS SO THAT A HIGHER NOISE LEVEL CAN BE TOLERATED WITHOUT SATURATION. SYSTEM LIMIT CAN BE RAISED FROM PRESENT 12 ARC-SEC PER SEC SPECIFICATION TO ABOUT 32 ARC-SEC PER SEC WITH MODEST CHANGES. WHILE THIS DOES NOT MAKE HIGH NOISE ACCEPTABLE, IT PERMITS SYSTEM TO FUNCTION, AT LEAST, AND, AT SHORT EXPOSURE TIMES, WILL PROBABLY PERMIT FULLY SATISFACTORY OVERALL SYSTEM PERFORMANCE. OVERALL STABILIZATION SYSTEM SPEC IS 35 ARC-SEC PER SEC, BUT OBVIOUSLY THIS CANNOT BE ACHIEVED IF NOISE INPUT IS 32 ARC-SEC PER SEC.

E. [] SHOULD PERFORM, OR SUBCONTRACT [] TO PERFORM, ALL THE FOLLOWING TESTS:

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1. THOROUGH PRESSURE AND TEMPERATURE ENVIRONMENTAL TEST OF PRESENT PACKAGES TO DEMONSTRATE COMPLIANCE WITH SPECIFICATION. DURING THESE AND OTHER TESTS, ELECTRICAL NOISE SHOULD BE MEASURED ON A HIGH BANDWIDTH RECORDER AND/OR AN OSCILLOSCOPE SO THAT MEASURING INSTRUMENT DOES NOT MASK NOISE.

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2. SUBSTITUTION OF A NOISY "PITCH" GYRO FROM A PACKAGE IN THE ROLL OR "YAW" GYRO MOUNT. THIS SHOULD DETERMINE IF THE GYRO OR THE MOUNTING IS GIVING THE TROUBLE.

3. USE OF A HIGH GAIN PROPORTIONAL TEMPERATURE CONTROL ON EACH GYRO RATHER THAN A SINGLE CONTROL, IF REQUIRED AFTER THE RESULTS OF E-1.

4. TRIAL OF SIMPLIFIED ELECTRONICS PER NOTIONS OF [REDACTED] TO IMPROVE RELIABILITY AND MAYBE REDUCE ELECTRONIC CONTRIBUTION TO NOISE.

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5. DETERMINATION OF GYRO TIME CONSTANT, TO VERIFY THAT THE PRODUCTION GYROS HAVE THE SAME CHARACTERISTICS AS THE BREADBOARD.

6. VARY THE VOLTAGE ON THE SPIN MOTOR EXCITATION TO DETERMINE THE ADEQUACY OF THE SPIN SUPPLY.

7. CORRELATE MOTOR POWER WITH NOISE TO DETERMINE IF THE NOISE CAN BE BUCKED OUT.

8. FOR PURELY ITS EDUCATIONAL VALUE IN HOPE IT WILL SHED LIGHT, VARY THE FREQUENCY OF THE SPIN MOTOR EXCITATION, AND OBSERVE THE SPECTRUM OF OUTPUT NOISE, TO CLARIFY CONTRIBUTION OF BEARING NOISE.

6. FURTHER REPORT NEXT WEEK.

END OF MESSAGE

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